AMENDMENTS TO THE CLAIMS

Please cancel Claims 1-3, 17 and 18; and add new Claims 19-32 as follows.

LISTING OF CLAIMS

1.-3. (cancelled)

- 4. (previously presented) A process for preparing a catalyst for ethylene polymerization, the catalyst comprising a magnesium halide derived from a magnesium compound represented by a formula $(RM_gX)_p(MgX_2)_q$, in which R is an alkyl group having from 3 to 12 carbon atoms, X is halogen, and the molar ratio of q to p is between 0 and 1; wherein the solid catalyst for the ethylene polymerization is prepared by a process comprising:
- (1) reacting powdered magnesium with an alkyl halide of formula RX in an ether solvent to form a magnesium compound having a structure of formula $(RMgX)_p(MgX_2)_q$, in which R is an alkyl group having from 3 to 12 carbon atoms, X is halogen, and the molar ratio of q to p is between 0 and 1, wherein the molar ratio of the powdered magnesium to the alkyl halide is from 1:1 to 1:3;
- (2) impregnating the magnesium compound onto silica carrier and drying to provide a magnesium compound-loaded silica support, wherein the silica is used in such an amount that per gram silica loads from 0.5 to 5.0 mmol of magnesium element;
- (3) reacting the magnesium compound-loaded silica support of step (2) with an alkyl halide of formula R¹X, in which R¹ is an alkyl group having from 3 to 12 carbon atoms and X is halogen, in an alkane solvent to give a product, wherein the

molar ratio of Mg in the magnesium compound to the alkyl halide is in the range from 1:1 to 1:10;

- (4) reacting the product obtained from step (3) with a titanium compound and an alkyl aluminum compound to form a main catalyst component, wherein the titanium compound has a structure represented by formula Ti(OR²)_mCl_{4-m}, R² is an alkyl group having from 1 to 4 carbon atoms and m is from 0 to 4, the molar ratio of the Mg in the magnesium compound to the Ti in the titanium compound is in the range from 1:0.15 to 1:2.5, and wherein the alkyl aluminum compound has a structure represented by formula R³_nAlCl₃-n, R³ is an alkyl group having from 1 to 14 carbon atoms and n is from 1 to 3, the molar ratio of the Mg in the magnesium compound to the Al in the alkyl aluminum compound is in the range from 1:0.08 to 1:3; and
- (5) contacting the main catalyst component with a cocatalyst component to form the catalyst for ethylene polymerization, wherein the cocatalyst component is an organo-aluminum compound, and the molar ratio of the Ti in the main catalyst component to the Al in the cocatalyst component is in the range from 1:30 to 1:300.
- 5. (previously presented) The process according to claim 4, wherein the molar ratio of q to p is in the range of from 0.05 to 0.95.
- 6. (previously presented) The process according to claim 4, wherein X in the magnesium compound is chlorine.

- 7. (previously presented) The process according to claim 4, wherein the ether solvent is aliphatic hydrocarbyl ethers, aromatic hydrocarbyl ethers or cyclic ethers.
- 8. (previously presented) The process according to claim 7, wherein the ether solvent is diethyl ether, di-n-propyl ether, di-n-butyl ether, di-isobutyl ether, diphenyl ether, methyl phenyl ether, tetrahydrofuran, or mixture thereof.
- 9. (previously presented) The process according to claim 4, wherein the organo-aluminum compound is triethyl aluminum, diethyl aluminum chloride, triisobutyl aluminum, tri-n-hexyl aluminum, or mixture thereof.
- 10. (previously presented) The process according to claim 4, wherein the alkyl halide of formula RX and formula R¹X is an alkyl chloride.
- 11. (previously presented) The process according to claim 10, wherein the alkyl halide of formula RX and formula R¹X is independently chloropropane, chloro-n-butane, isobutyl chloride, isopentyl chloride or mixture thereof.
- 12. (previously presented) The process according to claim 4, wherein the titanium compound is titanium tetrachloride, tetrabutyl titanate, methoxy titanium trichloride, butoxy titanium trichloride, or mixture thereof.

- 13. (previously presented) The process according to claim 4, wherein the alkyl aluminum compound is triethyl aluminum, triisopropyl aluminum, triisobutyl aluminum, tri-n-hexyl aluminum, tri-n-octyl aluminum, tri(2-ethylhexyl) aluminum, diethyl aluminum chloride, ethyl aluminum dichloride, diisopropyl aluminum chloride, ethyl aluminum sesquichloride, or mixture thereof.
- 14. (previously presented) The process according to claim 4, wherein the alkane solvent is an paraffin hydrocarbon.
- 15. (previously presented) The process according to claim 14, wherein the alkane solvent is isopentane, hexane, n-heptane, octane, nonane, decane, or mixture thereof.
- 16. (previously presented) A solid catalyst for ethylene polymerization, comprising a magnesium halide derived from a magnesium compound represented by a formula $(RMgX)_p(MgX_2)_q$, in which R is an alkyl group having from 3 to 12 carbon atoms, X is halogen, and the molar ratio of q to p is between 0 and 1; wherein the solid catalyst for the ethylene polymerization is prepared by a process comprising:
- (1) reacting powdered magnesium with an alkyl halide of formula RX in an ether solvent to form a magnesium compound having a structure of formula $(RMgX)_p(MgX_2)_q$, in which R is an alkyl group having from 3 to 12 carbon atoms, X is halogen, and the molar ratio of q to p is between 0 and 1, wherein the molar ratio of the powdered magnesium to the alkyl halide is in the range from 1:1 to 1:3;

- (2) impregnating the magnesium compound onto silica carrier and drying to provide a magnesium compound-loaded silica support, wherein the silica is used in such an amount that per gram silica loads from 0.5 to 5.0 mmol of magnesium element;
- (3) reacting the magnesium compound-loaded silica support of step (2) with a titanium compound and an alkyl aluminum compound to give a product, wherein the titanium compound has a structure represented by formula Ti(OR²)_mCl_{4-m}, where R² is an alkyl group having from 1 to 4 carbon atoms and m is from 0 to 4, and the molar ratio of the Mg in the magnesium compound to the Ti in the titanium compound is in the range from 1:0.15 to 1:2.5, and wherein the alkyl aluminum compound has a structure represented by formula R³_nAlCl₃-n, where R³ is an alkyl group having from 1 to 14 carbon atoms and n is from 1 to 3, and the molar ratio of the Mg in the magnesium compound to the Al in the alkyl aluminum compound is in the range from 1:0.08 to 1:3;
- (4) reacting the product obtained from step (3) with an alkyl halide of formula R¹X, in which R¹ is an alkyl group having from 3 to 12 carbon atoms and X is halogen, in an alkane solvent to form a main catalyst component, wherein the molar ratio of Mg in the magnesium compound to the alkyl halide is in the range from 1:1 to 1:10; and
- (5) contacting the main catalyst component with a cocatalyst component to form the catalyst for ethylene polymerization, wherein the cocatalyst component is an organo-aluminum compound, and the molar ratio of the Ti in the main catalyst component to the Al in the cocatalyst component is in the range from 1:30 to 1:300.

17.-18. (cancelled)

- 19. (new) A solid catalyst for ethylene polymerization, comprising a magnesium halide derived from a magnesium compound represented by a formula $(RMgX)_p(MgX_2)_q$, in which R is an alkyl group having from 3 to 12 carbon atoms, X is halogen, and the molar ratio of q to p is between 0 and 1, wherein the solid catalyst for ethylene polymerization is prepared by a process comprising the steps of:
- (1) reacting powdered magnesium with an alkyl halide of formula RX in an ether solvent to form a magnesium compound having a structure of formula $(RMgX)_p(MgX_2)_q$, in which R is an alkyl group having from 3 to 12 carbon atoms, X is halogen, and the molar ratio of q to p is between 0 and 1, wherein the molar ratio of the powdered magnesium to the alkyl halide is from 1:1 to 1:3;
- (2) impregnating the magnesium compound onto silica carrier and drying to provide a magnesium compound-loaded silica support, wherein the silica is used in such an amount that per gram silica loads from 0.5 to 5.0 mmol of magnesium element;
- (3) reacting the magnesium compound-loaded silica support of step (2) with an alkyl halide of formula R¹X, in which R¹ is an alkyl group having from 3 to 12 carbon atoms and X is halogen, in an alkane solvent to give a product, wherein the molar ratio of Mg in the magnesium compound to the alkyl halide is in the range from 1:1 to 1:10;

- (4) reacting the product obtained from step (3) with a titanium compound and an alkyl aluminum compound to form a main catalyst component, wherein the titanium compound has a structure represented by formula Ti(OR²)_mCl_{4-m}, R² is an alkyl group having from 1 to 4 carbon atoms and m is from 0 to 4, the molar ratio of the Mg in the magnesium compound to the Ti in the titanium compound is in the range from 1:0.15 to 1:2.5, and wherein the alkyl aluminum compound has a structure represented by formula R³_nAlCl₃-n, R³ is an alkyl group having from 1 to 14 carbon atoms and n is from 1 to 3, the molar ratio of the Mg in the magnesium compound to the Al in the alkyl aluminum compound is in the range from 1:0.08 to 1:3; and
- (5) contacting the main catalyst component with a cocatalyst component to form the catalyst for ethylene polymerization, wherein the cocatalyst component is an organo-aluminum compound, and the molar ratio of the Ti in the main catalyst component to the Al in the cocatalyst component is in the range from 1:30 to 1:300.
- 20. (new) The solid catalyst of claim 19, wherein the molar ratio of q to p is in the range of from 0.05 to 0.95.
- 21. (new) The solid catalyst of claim 19, wherein X in the magnesium compound is chlorine.
- 22. (new) The solid catalyst according to claim 19, wherein the ether solvent is aliphatic hydrocarbyl ethers, aromatic hydrocarbyl ethers or cyclic ethers.

- 23. (new) The solid catalyst according to claim 22, wherein the ether solvent is diethyl ether, di-n-propyl ether, di-n-butyl ether, di-isobutyl ether, diphenyl ether, methyl phenyl ether, tetrahydrofuran, or mixture thereof.
- 24. (new) The solid catalyst according to claim 19, wherein the organoaluminum compound is triethyl aluminum, diethyl aluminum chloride, triisobutyl aluminum, tri-n-hexyl aluminum, or mixture thereof.
- 25. (new) The solid catalyst according to claim 19, wherein the alkyl halide of formula RX and formula R¹X is an alkyl chloride.
- 26. (new) The solid catalyst according to claim 25, wherein the alkyl halide of formula RX and formula R¹X is independently chloropropane, chloro-n-butane, isobutyl chloride, isopentyl chloride or mixture thereof.
- 27. (new) The solid catalyst according to claim 19, wherein the titanium compound is titanium tetrachloride, tetrabutyl titanate, methoxy titanium trichloride, butoxy titanium trichloride, or mixture thereof.
- 28. (new) The solid catalyst according to claim 19, wherein the alkyl aluminum compound is triethyl aluminum, triisopropyl aluminum, triisobutyl aluminum, tri-n-bexyl aluminum, tri-n-octyl aluminum, tri(2-ethylhexyl) aluminum, diethyl

aluminum chloride, ethyl aluminum dichloride, diisopropyl aluminum chloride, ethyl aluminum sesquichloride, butyl aluminum sesquichloride, or mixture thereof.

- 29. (new) The solid catalyst according to claim 19, wherein the alkane solvent is an paraffin hydrocarbon.
- 30. (new) The solid catalyst according to claim 29, wherein the alkane solvent is isopentane, hexane, n-heptane, octane, nonane, decane, or mixture thereof.
- 31. (new) The solid catalyst according to claim 1, wherein the process further comprising contacting ethylene and the catalyst.
- 32. (new) The solid catalyst according to claim 31, wherein the main catalyst component is suspended in a mineral oil to form a slurry for the polymerization of ethylene, and said main catalyst component comprises from 20 to 30 percent by weight of the slurry.